DRAFT ANNUAL OPERATING PLAN 2003

FIRE WEATHER SERVICES FOR MISSOURI, SOUTHERN ILLINOIS, SOUTHWEST INDIANA, AND WESTERN KENTUCKY

Photo by Randy Long. Location: Southern Missouri where the Morgan Spring Branch enters the Eleven Point River.

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I. General Information

U.S. Forest Service:	Mark Twain National Forest (MO)
	Shawnee National Forest (IL)
	Land Between the Lakes National Recreational Area (KY)
National Park Service:	Ozark National Scenic Riverways (MO)
	Carver National Monument (MO)
	Wilson's Creek National Battlefield (MO)
U.S. Fish and Wildlife Services:	Crab Orchard National Wildlife Refuge (IL)
	Cypress Creek National Wildlife Refuge (IL)

WFO Springfield and WFO Paducah shall provide forecasts to be used by federal, state, or local agencies for wildfire suppression. This includes routine Fire Weather Forecasts, Fire Weather Watches, Red Flag Warnings, National Fire Danger Rating System Forecasts, Spot Forecasts for Wildfires and Incident Responses.

A. Contact Point Information for WFO Paducah and WFO Springfield:

	WFO Paducah	WFO Springfield
Address:	8250 U.S. Highway 60 West Paducah, KY 42086	5805 West Highway EE Springfield-Branson Regional Arpt. Springfield, MO 65802
Phone:	(800) 533-7189	(800) 762-4363
Fax:	(270) 744-3828	(417) 863-6209
MIC:	Beverly Poole - Beverly.Poole@noaa.gov	William Davis - William.Davis@noaa.gov
Fire Weather Program Leaders:	Kelly Hooper - Kelly.Hooper@noaa.gov	Drew Albert - Drew.Albert@noaa.gov
Internet Access To Fire Weather Products:	www.crh.noaa.gov/pah/forecast/firewx.html	www.crh.noaa.gov/sgf/firewxpage.shtml

B. Service Backup

The following NWS offices will provide Service backup for fire weather products:

	WFO Paducah	WFO Springfield
Primary Backup:	WFO Louisville (502) 968-6329	WFO St. Louis (636) 447-1887
Secondary Backup:	WFO St. Louis (636) 447-1887	WFO Paducah (800) 533-7189

II. Basic Services

A. Fire Season

In general, the fire season can normally be divided into two seasons. The spring season extends from early February through mid May. The fall season extends from early October through mid December. Fire seasons vary with weather and frost. **Specific dates for starting and ending routine forecast services will be determined through coordination with the users and the National Weather Service.**

B. Fire Weather Forecast

In season daily routine forecasts are issued around 8:30 AM and 3:00 PM local time. Updates or amendments may be issued any time as needed.

A brief discussion of the key weather features with emphasis on the next two days will be included. Forecasts include sky condition, chance for precipitation, max/min temperatures, humidity values, and wind speed and direction. See the Fire Weather Forecast examples located in Appendix C.

Smoke management parameters, (1700ft/500m mixing height temperature, mixing height, transport wind, and atmospheric stability) will be included in all daytime forecast periods. (See Appendix C for example).

Only one extended forecast will be included at the end of the fire weather zones issued by WFO Springfield. However, depending upon the weather situation, additional extended forecasts may be needed. WFO Paducah will include an extended forecast for each fire weather zone.

Routine fire weather forecasts will include the following components:

1. Synopsis

The synopsis should be concise, but describe the main features adequately to help explain why the forecast weather will occur. Typically the synopsis will cover the next two days. Significant changes that occur in the short term or during the extended forecast period (day 3-7) should be mentioned in the synopsis. The synopsis will be headlined for fire weather watches, red flag warnings, and other significant weather.

2. Sky

This element describes the sky condition or trend over the county zone group for the forecast period. Some liberties may be taken with the use of descriptive terms (i.e. "a mix of sun and clouds").

3. Temperature

Temperatures will be encoded in degrees Fahrenheit. The maximum temperature will be forecast for the day period, and minimum at night. Use a 5 degree range in temperatures. Afternoon temperatures in valleys will likely exceed the forecast maximum temperature, and temperatures at ridge tops would be cooler.

4. Humidity

Relative humidity is expressed in percent. The minimum or lowest humidity will be forecast for the day period, and highest humidity at night. In reality, lower humidity than forecast will typically be observed in valleys during the afternoons, particularly on a day with full sunshine. Ridge tops will typically have higher humidity. Use a 5 percent range for relative humidity less than 40 percent, use a 10 percent range for relative humidity 40 percent or higher.

5. 20 Foot Wind

The forecast wind speed for the fire weather forecasts will reflect the 10 minute average wind that is commonly measured at fire weather sites. The wind direction will be forecast to the eight cardinal points of the compass and expressed in miles per hour. Wind direction will indicate the direction the wind is blowing from **(i.e. Southwest 15 mph).** Do not use the ambiguous term **"breezy"**, however **"windy"** and **"gusty"** are acceptable.

6. Wind Shift

If a shift in wind direction associated with a frontal passage is expected during the period, the new direction and wind speed will be forecast. Because a front may take several hours to move through a zone, the approximate time of the wind shift will be encoded **(i.e. Northwest 10 to 15 mph after midnight).**

7. Probability of Precipitation (POP) and Precipitation Type

The probability of precipitation (POP) expresses the chance that measurable rainfall will occur at any given point within a county zone group. Measurable rainfall is 0.01 inches or greater. Probability is expressed in percent. A forecast of the predominate type of precipitation will accompany a probability of precipitation forecast **(i.e. 40 percent chance of showers, 60 percent chance of rain, 90 percent chance of light snow).**

8. Precipitation Amounts

The expected average rainfall for a county zone group will be expressed in decimal notation in inches **(i.e. 0.10 to 0.50 inches, 1.00 to 1.50 inches).**

9. Duration

The average duration in whole hours that precipitation will occur in the county zone group.

10. Smoke Management Forecast

The forecast parameters include 1700 foot/500 meter mixing temperature, mixing height, transport wind, and stability index value. (See Appendix C for example.)

a. 1700 foot (500 meter) Mixing Height Temperature

This is the surface temperature that must be reached in order for the mixing depth to reach 1700 feet. Once the forecast temperature is reached at the burn site, it can be assumed that the mixing height above the burn site is at least 1700 feet or 500 meters.

Note: One consequence of the Clean Air Act, is that land managers must practice principles of careful smoke management. This is done by combining favorable meteorological conditions with

a variety of prescribed fire techniques so that smoke will be readily dispersed. The Clean Air Act has established 500 meters as a minimum for mixing height for permitting prescribed burning.

b. Afternoon Mixing Height

Mixing height is the extent or depth to which smoke will be dispersed by means of turbulence and diffusion. The forecast of mixing height is expressed in feet above ground level (AGL).

c. Transport Wind

Transport wind is the average wind speed in meters/second in the mixing depth above the surface. These winds are good indications of the horizontal dispersion of suspended particles. The transport wind is the forecast wind at the time of maximum mixing of the atmosphere, normally during the mid afternoon. Usually a wind of less than 4 meters/second restricts an agency from burning.

d. Stability

The forecasts of stability classes are an attempt to qualify the degree to which vertical motion in the atmosphere is enhanced. Atmosphere stability suggests how readily a pollutant will be dispersed. The more unstable the forecast stability class, the more readily a pollutant will be dispersed. Stability classes are dependant on the temperature and moisture profiles of the atmosphere which are influenced by the amount of incoming solar radiation and cloud cover. These terms will be used to describe the stability:

Description	**Lifted Index (LI)**
Very stable	LI's $\succ$ 10
Stable	LI's $\preceq$ 10 and $\succ$ 4
Slightly unstable	LI's $\preceq$ 4 and $\succ$ -2
Moderately unstable	LI's $\preceq$ -2 and $\succ$ -8
Very unstable	LI's $\preceq$ -8

11. Extended Forecast

A general extended forecast will be included at the end of the fire weather forecast text. This will include general weather conditions, high and low temperatures, and a surface wind forecast if sustained winds of greater than 15 mph would be possible. The extended forecast will cover a period out to 7 days and should be considered for general planning purposes only.

C. Fire Weather Watches and Red Flag Warnings

The following criteria will be used as a guide when considering issuing a Fire Weather Watch or Red Flag Warning:

- 10 hour fuel moisture reaching below 8 percent for 2 days or more.

- Forecast Relative Humidity (RH) values 25% or less

- Forecast 20 foot Wind Speed - sustained winds of greater than 15-20 mph.

These criteria are general parameters and they should be considered with the whole fire weather environment in mind. Fire weather forecasters will still consider issuing Fire Weather Watches and Red Flag Warnings if one or two parameters are conducive to the ignition and spread of wildfires while the other parameter(s) is(are) marginal. Example: If the RH drops to 30 percent, the fuel moisture is 7 %, and the wind is blowing at 20 to 25 mph and drought conditions exist, a Fire Weather Watch or Red Flag Warning will likely be considered.

The fire weather forecaster will consult with designated user agencies before issuing any Fire Weather Watch or Red Flag Warning.

If the forecast office issues a Fire Weather Watch or Red Flag Warning for a specific National Forest or National Park, the fire weather forecaster will headline the forecast with the watch or warning. A Fire Weather Watch is used to alert the user to the possible development of a Red Flag event in the near future. This could be up to 72 hours in advance.

A Red Flag Warning will be issued to warn the user of an impending or on-going red flag event. A Red Flag Warning will be issued immediately when red flag conditions are occurring. Otherwise, it will be issued for impending red flag conditions when there is a high degree of confidence that conditions will develop and the forecast time of onset for the event is less than 24 hours.

Because of the restriction of user programs brought about by a Red Flag Warning, it is imperative that the warning be promptly canceled when the conditions cease to exist or if the conditions are no longer expected to develop. The cancellation will be issued under the RFW product header.

D. National Fire Danger Rating System (NFDRS) Fire Weather Point Forecasts and Point Forecast Terminology

The National Fire Danger Rating System (NFDRS) point forecasts will be issued by 2:00 PM by the WFOs at Springfield and Paducah daily during the fire weather season.

The NFDRS is a quantitative means for evaluating the fire danger across a vast area such as a forest. This complex model processes daily weather observations, fuel moisture, and forecasts as inputs. The resulting numeric output and indices suggest the severity of fire danger over a large area. The following are the sites that NFDRS forecasts will be issued:

Site	County	State	Station I.D.	Issuing WFO
Ava	Douglas	Missouri	238602	Springfield

Sinkin	Dent	Missouri	236403	Springfield
Carr Creek	Shannon	Missouri	237401	Paducah
Big Springs	Carter	Missouri	239004	Paducah
Doniphan	Ripley	Missouri	239102	Paducah
Dixon Springs	Pope	Illinois	119501	Paducah
Golden Pond	Trigg	Kentucky	159901	Paducah

Eample of a NFDRS forecast:

FCST,238602,990503,13,2,72,65,1,1,S,15,M,72,54,95,35,0,0,N

ID 1	DATE 2	VT 3	WX 4	TT 5	RH 6	L1 7	L2 8	DD 9	VV 10	M 11	TX 12	TN 13	HX 14	HN 15	D1 16	D2 17	Y/N 18
238602	990503	13	2	71	60	1	1	S	14	M	77	52	95	30	0	1	N

FCST...must always precede the forecast and each entry must be separated by a comma.

1. Station I.D. (ID)

Each station forecast point has an identification number assigned to it.

2. Date (DATE)

The date in the YYMMDD format. This is the valid date for the point forecast. A forecast valid March 1 1997 would be coded as 970301. (Today's product would have tomorrow's date).

3. Valid Time (VT)

This is the valid time for the forecast...1300 CST tomorrow (1pm).

4. State of Weather (WX)

Forecasters will select the highest code for state of weather which will describe the weather at the basic observation time the next day. For example, fog and rain are expected: Code 6 should be forecast. It is important to distinguish between Code 6 (rain) and Code 8 (showers). A forecast of Code 6 will zero out the indices in the NFDRS. If the type of precipitation is showery in character, then Code 8 will be forecast.

Weather codes: 0=Clear 1=Scattered 2=Broken 3=Overcast 4=Fog 5=Drizzle 6=Rain 7=Snow/Sleet 8=Showers 9=Thunderstorm

5. Temperature (TT)

This is the valid time for the forecast...1300 CST tomorrow (1pm).

6. Relative Humidity (RH)

Relative humidity at basic observation time of 1:00 PM tomorrow.

7 and 8. Lightning Activity Level (Ll) and (L2)

This is the predicted lightning activity level. **This parameter is not forecast, rather a default value of 1 (no thunderstorms) is always entered.**

L1 is the lightning activity level predicted from 1:00 PM to midnight. L2 is the lightning activity level from midnight to the next midnight. A single digit (1 through 6) will be used.

1 - No thunderstorms (default value)

2 - Few building cumulus with isolated thunderstorms.

3 - Much building cumulus with scattered thunderstorms, with light to moderate rain.

4 - Thunderstorms common, not obscuring the sky, with moderate rain.

5 - Thunderstorms common, occasionally obscuring the sky, with moderate to heavy rain.

6 - Much building cumulus with scattered thunderstorms, dry/no rain. (Same as 3, but dry, no rain.)

9. Wind Direction (DD)

Wind direction by eight compass points **(i.e. N, NE, E, SE, S, SW W, NW).**

10. Wind Speed (VV)

The forecast 10-minute average wind speed in miles per hour at 1:00 PM tomorrow.

11. 10 Hour Time Lag Fuel Moisture (M)

The 10-hour time lag fuel moisture is entered as M for missing or left blank.

12. Maximum Temperature (TX)

The maximum temperature (deg F) expected during the 24-hour period from basic observation time today to basic observation time tomorrow. The maximum value cannot be lower than what was observed today or forecast at basic observation time tomorrow.

13. Minimum Temperature (TN)

The minimum temperature (deg F) expected during the 24-hour period from basic observation time today to basic observation time tomorrow. The forecast minimum cannot be higher than the temperature observed or forecast at the basic observation time.

14. Maximum Relative Humidity (HX)

Forecast maximum humidity over the 24-hour period between basic observation times.

15. Minimum Relative Humidity (HN)

Forecast minimum humidity (deg F) over the 24-hour period between basic observation times. The minimum value forecast cannot be higher than the observed or forecast values at basic observation times.

16. Precipitation Duration 1:00 PM to 5:00 AM (D1)

The expected duration in whole hours that precipitation will fall at the site for the first 16 hours during the 24-hour period between observation times.

17. Precipitation Duration 5:00 AM to 1:00 PM (D2)

The expected duration in whole hours that precipitation will fall at the site for the last 8 hours during the 24-hour period between observation times.

18. Wet Fuels Conditions (Y/N)

When fuels are anticipated to be wet at observation time, 1:00 PM the next day, a Y (Yes) should be inserted in the appropriate column in WIMS. If a wet fuel condition is not anticipated at 1:00 PM the next day, enter N (No). If snow cover is anticipated, a wet fuel condition should be entered.

E. Spot Forecasts

Spot forecasts are non-routine specific point forecasts prepared for prescribed fires or wildfires. Any legitimate Federal, State, County, or municipal government agency can request spot forecast support. Requests for a spot forecast will normally be transmitted to the WFO via the Internet Spot Forecast Request Program (NWS Spot), telephone, or fax. As of December, 2002 only WFO Paducah and WFO Springfield have the capability of Internet service.

Spot forecasts for active fires should be updated when the forecaster becomes aware of any significant unanticipated weather changes that may have an impact on fire suppression or prescribed burning operations and/or safety of personnel. Updates can consist of a telephone/verbal update in lieu of a written product. Land management personnel should contact the WFO if forecast conditions become unrepresentative of the observed weather.

Unless otherwise stated by the requesting agency, the forecast parameters of sky condition, weather, temperature, relative humidity, 20 foot wind, significant/sudden changes in wind speed or direction, along with mixing heights, transport winds, and stability, if available, shall be provided.

Site forecast for ongoing wildfires are crucial to fighting fires and personnel safety. Of paramount importance are forecasts of wind velocity and humidity. For an ongoing wildfire, an attempt should be made to provide a current observation at the time a forecast is requested. The observation will aid the forecaster in preparing a more accurate site specific forecast.

WFO Pleasant Hill (816 540-5147) and WFO St. Louis (636 447-1887) will provide prescribed burn and wildland fire spot forecasts for their respective areas of responsibility outside the routine fire weather zone forecast boundary served by WFO Springfield and WFO Paducah (see Appendix D for service areas)

1. Spot Forecast Requests Via the NWS Spot Forecast Program

Spot forecasts via the Internet can be requested by any legitimate Federal, State, County/Local government agency. The forecast request web site can be accessed from WFOs Springfield and Paducah's fire weather pages. General instructions on the use of the program are available on WFO Springfield's web site.

2. Spot Forecast Via Fax

The WFOs will use a fire weather forecast fax sheet similar to the attachment in Appendix B. Fax sheets may vary from WFO to WFO but should contain the same general weather elements as listed in the attachment. The agency requesting a faxed forecast should be as specific as possible when requesting weather forecast information to include ignition time (for prescribed fire), valid time of the forecast, and weather elements requested.

3. Spot Forecast Requests Via Telephone

Spot requests via telephone should be reserved for occasions where a quick forecast update is needed and time restraints and/or available resources prohibit the use of the Internet of fax. Both the requesting agency and the WFO are highly encouraged to document as thoroughly as possible any information communicated during a phone/verbal spot forecast briefing.

F. Hazardous Weather Outlooks

Hazardous Weather Outlooks are issued by weather forecast offices to alert the general public to potentially dangerous weather situations. When a combination of meteorological conditions leads to an increased fire danger but falls short of Fire Weather Watch or Red Flag Warning criteria, this product is issued to the general public. This statement is issued to make the public aware of a heightened fire danger and to discourage open burning and careless use of smoking materials. Approval of the user agencies is not necessary to issue this statement. (See Appendix C for an example).

Fire Weather Watches and Red Flag Warnings will also be mentioned in the form of a general text message to the general public using the Hazardous Weather Outlook.

III. Special Services

Special meteorological services meet the needs of agencies who often have unique requirements for weather support, and may best be performed by the fire weather meteorologist away from the home forecast office. These services usually must be initiated by the requesting agency, and costs such as travel and per diem will be charged to a reimbursable task number assigned for the project.

Special services may include fire weather station visits; other familiarization trips to the forest; and observer training sessions, S-290, S-390, and S-490 courses. The fire weather meteorologist may be dispatched to a wildfire or to a prescribed burn on occasion.

A. Fire Weather Stations

The fire weather forecaster may be requested to accompany an official on a fire weather station visitation. A letter requesting the meteorologist should be mailed to WFO Paducah or WFO Springfield about 2-3 weeks in advance of the planned trip. The letter does not need to be specific about dates, this can be arranged over the phone. If the trip involves an overnight stay, the letter should state that the requesting agency will pay travel expenses. A one day trip will not incur any costs to the requesting agency.

Supplies, equipment, and maintenance of the fire weather station is the responsibility of the land management agency. If a new station is being established, or an old station is moved to another location, a station number will be assigned by the fire weather program leader at the WFO. The land management agency should provide the latitude and longitude of the new station, and the elevation when requesting a station number.

B. Training

When the land management agency wishes for a fire weather forecaster to attend a course, the same procedure for requesting a forecaster to a station visitation should be followed, except that specific dates should be given in the letter. The letter will be forwarded to NWS Central Region Headquarters so that a reimbursable task code can be assigned for the trip.

C. Air Transportation Modular Unit (ATMU)

The ATMU is a collection of weather instruments and tools which can be transported to a wildfire by air freight. The seven separate modules comprising the ATMU weigh 375 pounds. Each ATMU consist of satellite receiving equipment and facsimile, climatronics for the automatic recording of wind, humidity, temperature, a theodolite with tripod and calculator for computing upper level winds, nozzle and regulator for helium tanks, belt weather kits, a remote data terminal for accessing a NWS computer, and various office supplies.

The ATMU can only be operated by a certified ATMU meteorologist. The meteorologist will work closely with the Fire Behavior Analyst or Planning Section Chief in setting up the ATMU operational area at the incident site. None are available in Missouri or Illinois. In extreme emergencies one can be ordered through the USDA Forest Service at The Eastern Area Coordination Center in Milwaukee. The

Forest Service will contact the NWS through the appropriate communication channels for qualified personnel to operate the equipment. The using agency will pay all expenses incurred by the NWS.

The requesting agency is responsible for any storage of the ATMU while in transit, sheltering of the unit and meteorologist at the site, provision for priority telephone access for short periods during the day, and 120v AC electrical power. The meteorologist may request a tank of helium in order to inflate balloons for the wind aloft observations.

The ATMU's certified meteorologist may be requested for critical or emergency situations other than a wildfire. The operating principle, however, is that the requesting agency will bear all costs.

D. Mobilization of ATMU Certified Meteorologist

The first notification of mobilization of the fire weather meteorologist will normally be by phone from the NWS Central Region Fire Weather Program Manager. The following information should be obtained from the program manager if available at that time:

1. Location and name of fire or Incident

2. Fire resource order number

3. Arrangements for travel

After notification, immediate steps should be taken to cover the shifts that the fire weather meteorologist would otherwise be working at the home office. A laptop computer, portable printer, and modem will be hand carried by the fire weather meteorologist to the incident.

IV. Weather Information and Management System (WIMS) - Dissemination of Products

The principal method of dissemination of the observations and forecasts is through WIMS. Observations that are entered into WIMS at the Kansas City Computer Center are transmitted to the NWS Telecommunications Gateway Facility in Washington D.C. The observations are collected in bulletins that are transmitted to the National Weather Service Forecast Offices where they are compiled into various fire weather products and then transmitted via the NWS Telecommunications Gateway Facility to WIMS.

V. Summary of Changes

2003 Changes

- Scaled back and reformatted the product examples section.

- Added table of product and WMO.

- Added/revised the spot forecast section to include requesting spot forecasts via the Internet.

- Revised the Hazardous Weather Forecast example to conform to the National Weather Service standard format.

- Updated the table of available products in Appendix A to include the Spot Weather Forecast product.

VI. Signature Page

An approval letter will be sent to each of the agencies below. Copies of these letters will be kept on file at the National Weather Service Forecast Offices (Springfield and Paducah).

National Weather Service		
Office	Approving Authority	Date Signed
NWS Springfield, MO	MIC	
NWS Paducah, KY	MIC	
NWS St. Louis, MO	MIC	
NWS Pleasant Hill, MO	MIC	
Central Region Headquarters, Kansas City, MO	Regional Operations Services Meteorologist	

User Agency: Department of Agriculture		
Office	Approving Authority	Date Signed
U.S. Forest Service - Mark Twain National Forest		
U.S. Forest Service - Shawnee National Forest		
U.S. Forest Service - Land Between the Lakes National Recreation Area		

User Agency: Department of Interior		
Office	Approving Authority	Date Signed
Crab Orchard National Wildlife Refuge		
National Park Service - Ozark Scenic Riverways		
Cypress Creek National Wildlife Refuge		

VII. Appendices

Appendix A - Product Identification List

Product	AFOS PIL WFO Paducah	AFOS PIL WFO Springfield	WMO Header (Both Offices)
Fire Weather Forecast	SDFFWFPAH	STLFWFSGF	FNUS53
Fire Weather NFDRS Point Forecast	SDFFWMPAH	STLFWMSGF	FNUS83
Fire Weather Watch/ Red Flag Warning	SDFRFWPAH	STLRFWSGF	WWUS83
Spot Forecasts	SDFFWSPAH	STLFWSSGF	FNUS73
Hazardous Weather Outlook	SDFHWOPAH	STLHWOSGF	FLUS43

Appendix B: Spot Weather Forecast Worksheet

Requesting Agency/Person/Call-back Telephone Number/FAX:

Date/Time Request Made:

Location of Spot Forecast:

Time Period of Forecast: from:_____ to: _____

A. Sky/Weather (cloud cover, pcpn, tstms, etc.)

B. Temperature (max/min and times of occurrence)

C. Relative Humidity (max/min and times of occurrence)

D. Wind at 20 feet (include gradual changes)

E. Significant/Sudden changes in wind direction and/or wind speed. (See criteria on next page)

F. Transport Wind (speed/direction)

G. Mixing Heights (morning or afternoon)

H. Haines Index

I. Forecast beyond Spot Forecast period - (up to 3 days (temp/wind/pcpn/RH) - may be optional).

Appendix C - Fire Weather Product Examples

1. Routine Fire Weather Forecast - 830 AM

ZCZC STLFWFSGF
TTAA00 KSGF DDHHMM

FIRE WEATHER FORECAST
NATIONAL WEATHER SERVICE SPRINGFIELD MO
830 AM CST SUN FEB 14 2000

...HEADLINE... ***(Depends upon the weather...required for Red Flag Warnings/Fire Weather Watches.)***

.SYNOPSIS... ***(Concise explanation of the weather situation.)***

MOZ055>058-066>071-077>081-088>090-093-094-101-142100
BARTON-BENTON-CAMDEN-CEDAR-DADE-DALLAS-GREENE-HICKORY-JASPER-LACLEDE-LAWRENCE-MARIES-
MCDONALD-MILLER-MORGAN-NEWTON-PHELPS-POLK-PULASKI-ST. CLAIR-VERNON-
830 AM CST SUN FEB 14 2000

.TODAY...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

1700 FT MIXING TEMP.....
MIXING HEIGHT.....
TRANSPORT WIND.....
STABILTY INDEX.....

.TONIGHT...

SKY/WEATHER.....
TEMP.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

.MONDAY...
(Same weather elements as the Today period)

.EXTENDED FORECAST (NO WINDS ABOVE 15 MPH UNLESS SPECIFIED OR NEAR THUNDERSTORMS)...

.TUESDAY...
.WEDNESDAY...
.THURSDAY...
.FRIDAY...
.SATURDAY...

Note: Depending on weather conditions...only one extended forecast section will be included in the fire weather zones. WFO Paducah will include an extended forecast for each fire weather zone

2. Routine Fire Weather Forecast - 300 PM

ZCZC STLFWFSGF
TTAA00 KSGF DDHHMM

FIRE WEATHER FORECAST
NATIONAL WEATHER SERVICE SPRINGFIELD MO
300 PM CST SUN FEB 14 2000

...HEADLINE... ***(Depends upon the weather...required for Red Flag Warnings/Fire Weather Watches.)***

.SYNOPSIS... ***(Concise explanation of the weather situation.)***

MOZ055>058-066>071-077>081-088>090-093-094-101-142100
BARTON-BENTON-CAMDEN-CEDAR-DADE-DALLAS-GREENE-HICKORY-JASPER-LACLEDE-LAWRENCE-MARIES-
MCDONALD-MILLER-MORGAN-NEWTON-PHELPS-POLK-PULASKI-ST. CLAIR-VERNON-
300 PM CST SUN FEB 14 2000

.TONIGHT...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

.MONDAY...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

1700 FT MIXING TEMP.....
MIXING HEIGHT.....
TRANSPORT WIND.....
STABILTY INDEX.....

.EXTENDED FORECAST (NO WINDS ABOVE 15 MPH UNLESS SPECIFIED OR NEAR THUNDERSTORMS)...

.TUESDAY...
.WEDNESDAY...
.THURSDAY...
.FRIDAY...
.SATURDAY...
.SUNDAY...

Note: Depending on weather conditions...only one extended forecast section will be included in the fire weather zones. WFO Paducah will include an extended forecast for each fire weather zone

3. Fire Weather Watch

ZCZC STLRFWSGF
TTAA00 KSGF DDHHMM

FIRE WEATHER WATCH
NATIONAL WEATHER SERVICE SPRINGFIELD MO
830 AM CST SUN FEB 14 2000

...FIRE WEATHER WATCH MONDAY...

.SYNOPSIS... ***(Fire Weather Watch reasoning with brief synopsis)***

MOZ055>058-066>071-077>081-088>090-093-094-101-142100
BARTON-BENTON-CAMDEN-CEDAR-DADE-DALLAS-GREENE-HICKORY-JASPER-LACLEDE-LAWRENCE-MARIES-
MCDONALD-MILLER-MORGAN-NEWTON-PHELPS-POLK-PULASKI-ST. CLAIR-VERNON-
830 AM CST SUN FEB 14 2000

...FIRE WEATHER WATCH MONDAY...

.TODAY...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

1700 FT MIXING TEMP.....
MIXING HEIGHT.....
TRANSPORT WIND.....
STABILTY INDEX.....

.TONIGHT...

SKY/WEATHER.....
TEMP.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

.MONDAY...
(Same weather elements as the Today period)

.EXTENDED OUTLOOK (NO WINDS ABOVE 15 MPH UNLESS SPECIFIED OR NEAR THUNDERSTORMS)...

.TUESDAY...
.WEDNESDAY...
.THURSDAY...
.FRIDAY...
.SATURDAY...

Note: Depending on weather conditions...only one extended forecast section will be included in the fire weather zones. WFO Paducah will include an extended forecast for each fire weather zone

4. Fire Weather Watch Cancellation

ZCZC STLRFWSGF
TTAA00 KSGF DDHHMM

FIRE WEATHER WATCH
NATIONAL WEATHER SERVICE SPRINGFIELD MO
830 AM CST SUN FEB 14 2000

...FIRE WEATHER WATCH FOR THE EASTERN ZONES FOR MONDAY HAS BEEN CANCELED. HOWEVER THE WARM AND DRY CONDITIONS WILL CONTINUE.

.SYNOPSIS... ***(Concise explanation of the weather situation.)***

MOZ055>058-066>071-077>081-088>090-093-094-101-142100
BARTON-BENTON-CAMDEN-CEDAR-DADE-DALLAS-GREENE-HICKORY-JASPER-LACLEDE-LAWRENCE-MARIES-
MCDONALD-MILLER-MORGAN-NEWTON-PHELPS-POLK-PULASKI-ST. CLAIR-VERNON-
830 AM CST SUN FEB 14 2000

...FIRE WEATHER WATCH FOR MONDAY HAS BEEN CANCELED...

.TODAY...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

1700 FT MIXING TEMP.....
MIXING HEIGHT.....
TRANSPORT WIND.....
STABILTY INDEX.....

.TONIGHT...

SKY/WEATHER.....
TEMP.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

.MONDAY...
(Same weather elements as the Today period)

.EXTENDED OUTLOOK (NO WINDS ABOVE 15 MPH UNLESS SPECIFIED OR NEAR THUNDERSTORMS)...

.TUESDAY...
.WEDNESDAY...
.THURSDAY...
.FRIDAY...
.SATURDAY...

Note: Depending on weather conditions...only one extended forecast section will be included in the fire weather zones. WFO Paducah will include an extended forecast for each fire weather zone

5. Red Flag Warning

ZCZC STLRFWSGF
TTAA00 KSGF DDHHMM

RED FLAG WARNING
NATIONAL WEATHER SERVICE SPRINGFIELD MO
830 AM CST SUN FEB 14 2000

...RED FLAG WARNING MONDAY...

.SYNOPSIS...***(Red Flag warning reasoning with brief synopsis)***

MOZ055>058-066>071-077>081-088>090-093-094-101-142100
BARTON-BENTON-CAMDEN-CEDAR-DADE-DALLAS-GREENE-HICKORY-JASPER-LACLEDE-LAWRENCE-MARIES-
MCDONALD-MILLER-MORGAN-NEWTON-PHELPS-POLK-PULASKI-ST. CLAIR-VERNON-
830 AM CST SUN FEB 14 2000

...RED FLAG WARNING MONDAY...

.TODAY...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

1700 FT MIXING TEMP.....
MIXING HEIGHT.....
TRANSPORT WIND.....
STABILTY INDEX.....

.TONIGHT...

SKY/WEATHER.....
TEMP.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

.MONDAY...
(Same weather elements as the Today period)

.EXTENDED OUTLOOK (NO WINDS ABOVE 15 MPH UNLESS SPECIFIED OR NEAR THUNDERSTORMS)...

.TUESDAY...
.WEDNESDAY...
.THURSDAY...
.FRIDAY...
.SATURDAY...

Note: Depending on weather conditions...only one extended forecast section will be included in the fire weather zones. WFO Paducah will include an extended forecast for each fire weather zone

6. Red Flag Warning Cancellation

ZCZC STLRFWSGF
TTAA00 KSGF DDHHMM

RED FLAG WARNING
NATIONAL WEATHER SERVICE SPRINGFIELD MO
830 AM CST SUN FEB 14 2000

...RED FLAG WARNING FOR THE EASTERN ZONES FOR MONDAY HAS BEEN CANCELED. HOWEVER THE WARM AND DRY CONDITIONS WILL CONTINUE.

.SYNOPSIS... ***(Concise explanation of the weather situation.)***

MOZ055>058-066>071-077>081-088>090-093-094-101-142100
BARTON-BENTON-CAMDEN-CEDAR-DADE-DALLAS-GREENE-HICKORY-JASPER-LACLEDE-LAWRENCE-MARIES-
MCDONALD-MILLER-MORGAN-NEWTON-PHELPS-POLK-PULASKI-ST. CLAIR-VERNON-
830 AM CST SUN FEB 14 2000

...RED FLAG WARNING FOR MONDAY HAS BEEN CANCELED...

.TODAY...

SKY/WEATHER.....
TEMPERATURE.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

1700 FT MIXING TEMP.....
MIXING HEIGHT.....
TRANSPORT WIND.....
STABILTY INDEX.....

.TONIGHT...

SKY/WEATHER.....
TEMP.....
RH.....
20 FT WIND.....
WIND SHIFT.....
CHC OF PCPN.....
TYPE.....
DURATION.....
AMOUNTS.....

.MONDAY...
(Same weather elements as the Today period)

.EXTENDED OUTLOOK...

.TUESDAY...
.WEDNESDAY...
.THURSDAY...
.FRIDAY...
.SATURDAY...

Note: Depending on weather conditions...only one extended forecast section will be included in the fire weather zones. WFO Paducah will include an extended forecast for each fire weather zone

7. Hazardous Weather Outlook

TTAA00 KSGF 111200
KSZ073-097-101-MOZ055>058-066>071-077>083-088>098-101>106-121200-

HAZARDOUS WEATHER OUTLOOK
NATIONAL WEATHER SERVICE SPRINGFIELD MO
100 PM CST WED NOV 20 2002

THIS HAZARDOUS WEATHER OUTLOOK IS FOR THE MISSOURI OZARKS AND EXTREME
SOUTHEAST KANSAS.

DAY ONE...

SOUTHWEST WINDS INCREASING TO 10 TO 20 MPH WITH HIGHER GUSTS ALONG WITH AFTERNOON RELATIVE HUMIDITY READINGS DROPPING TO 25 TO 30 PERECENT WILL COMBINE TO PRODUCE AN INCREASED GRASS FIRE DANGER OVER THE REGION TODAY. THE STRONGEST WINDS WILL OCCUR IN COUNTIES ALONG THE WESTERN MISSOURI STATE LINE WHERE WINDS ARE EXPECTED TO BE SOMEWHAT HIGHER.

THOSE PLANNING OUTDOOR BURNING PROJECTS TODAY SHOULD TAKE EXTRA PRECAUTIONS TO PREVENT THE OCCURRENCE OF UNCONTROLLED GRASS FIRES.

SPOTTER CALL TO ACTION STATEMENT...

SPOTTER ACTIVATION IS NOT EXPECTED THROUGH TONIGHT.

DAYS TWO THROUGH SEVEN...

NO HAZARDOUS WEATHER IS EXPECTED.

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8. Spot Forecast (from NWS Spot Internet Program)

VALID UNTIL 230 AM CST THU NOV 14 2002

IF CONDITIONS BECOME UNREPRESENTATIVE,
CONTACT THE NATIONAL WEATHER SERVICE.

DISCUSSION...CLOUDS WILL INCREASE ON THURSDAY AS A COLD FRONT APPROACHES THE REGION. FRONTAL PASSAGE WILL BE IN THE EARLY EVENING. THERE WILL BE A SLIGHT CHANCE OF SPRINKLES OR LIGHT RAIN LATE IN THE AFTER 4 PM.

FOR PLANNED IGNITION TIME OF 930 CST 11/14/02

SKY/WEATHER.....MOSTLY CLOUDY
TEMPERATURE.....51
HUMIDITY.....60 TO 65
20 FOOT WIND.....SOUTH 10 MPH
MIXING HEIGHT.....600 FT INCREASING TO 1700 FT BY NOON.
TRANSPORT WIND.....SW 7 M/S
WIND SHIFT.....GRADUAL SHIFT TO THE SOUTHWEST BY EARLY AFTERNOON

FOR THURSDAY AFTERNOON NOON TO 5 PM...

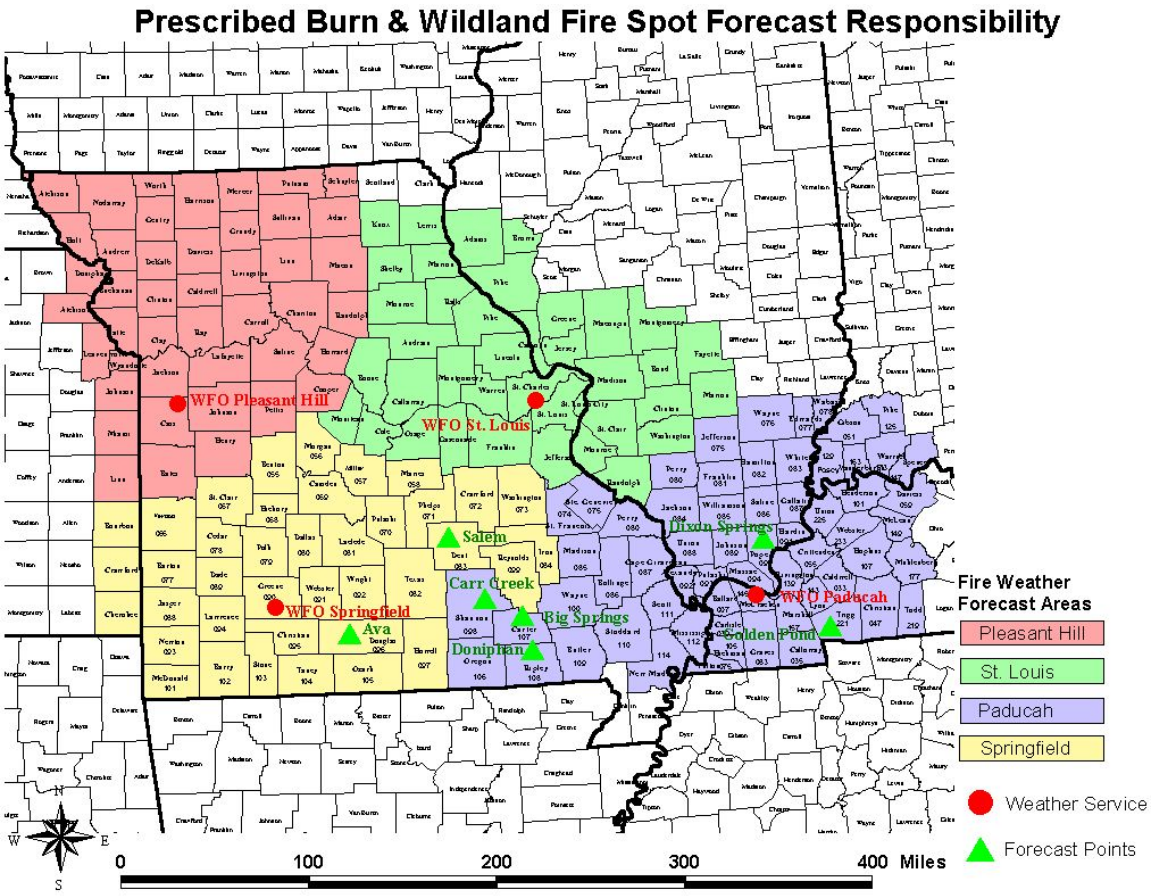
SKY/WEATHER.....CLOUDY
TEMPERATURE.....MAX 57 TO 62
HUMIDITY.....MIN 40 TO 45
20 FOOT WIND.....SOUTHWEST 10 TO 15
CHC OF PRECIPITATION(%)/TIMING...20% AFTER 4 PM
MIXING HEIGHT.....MAX 3000 FT
TRANSPORT WIND.....SW 7 M/S
HAINES INDEX.....4

$$

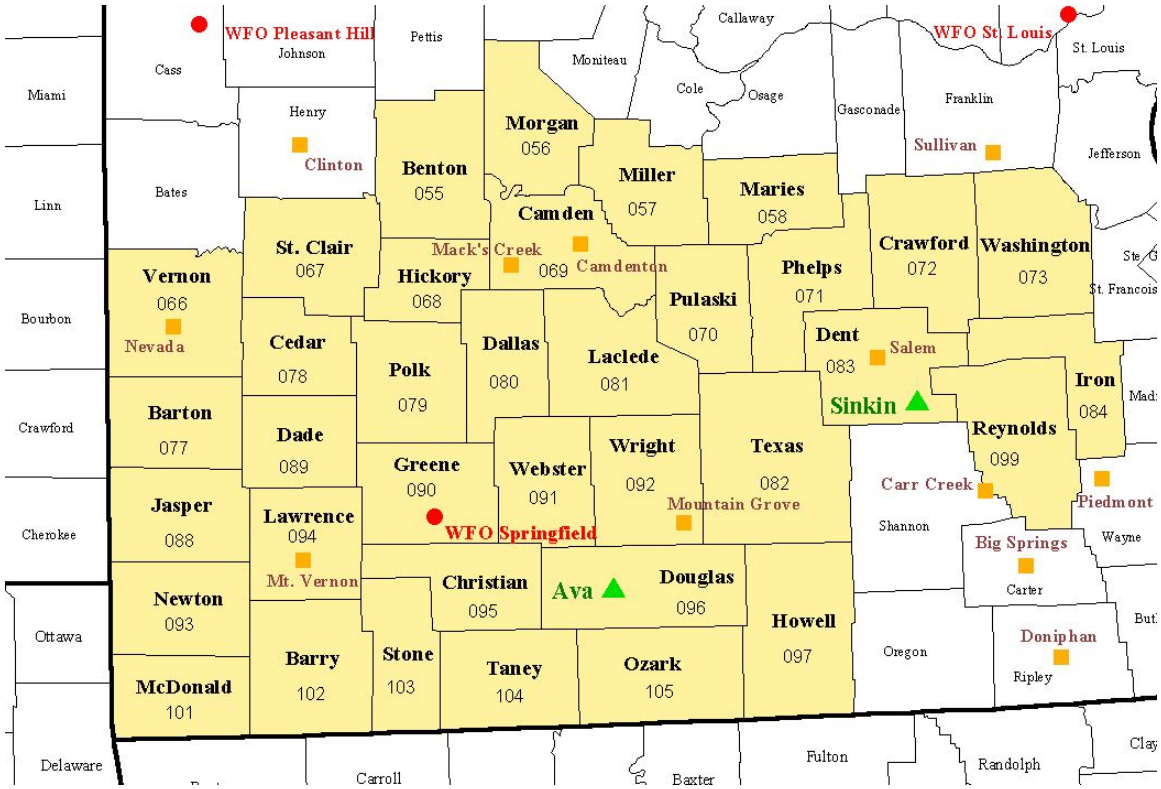
Note: Format will vary depending on weather elements requested.

Appendix D. Fire Weather Maps

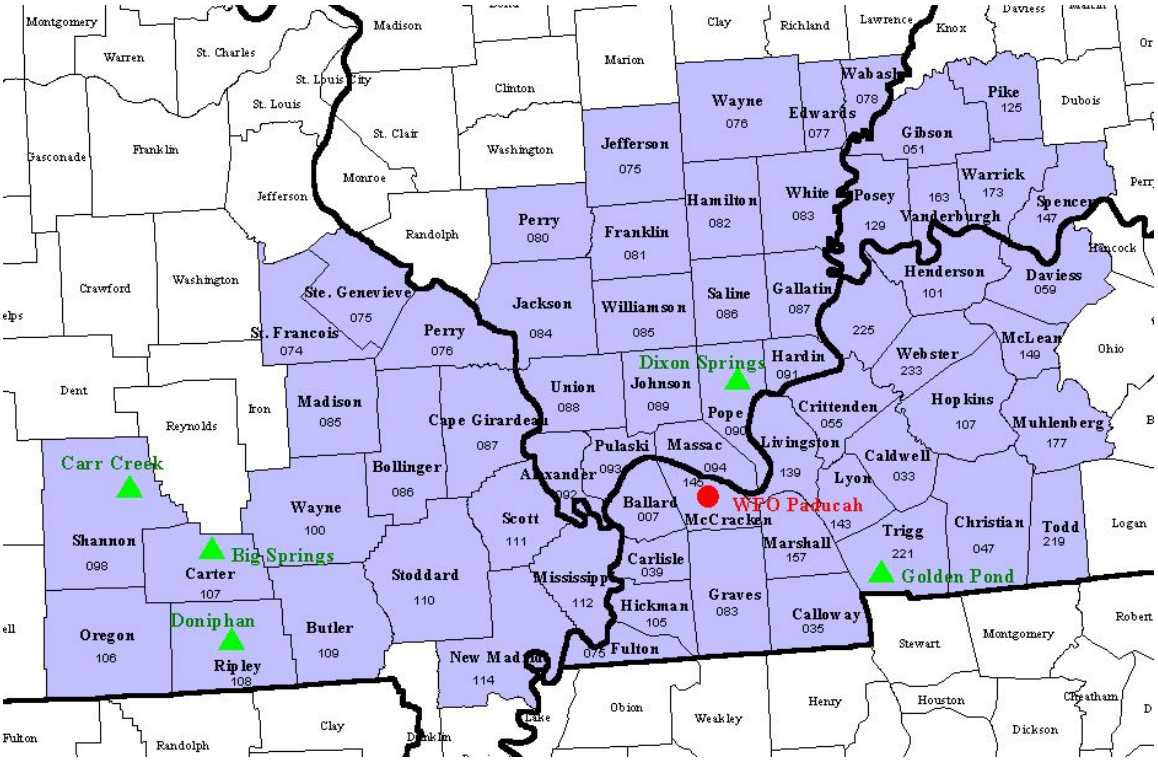
1. Prescribed Burn and Wildland Fire Spot Forecast Responsibility



2. WFO Springfield Fire Weather Map



3. WFO Paducah Fire Weather Map



4. County Warning and Forecast Areas